Allergic Rhinitis

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Objectives

- Understanding what allergic rhinitis is
- How to recognize allergic rhinitis
- Treatment

Definition

Allergic rhinitis (AR) = inflammation of the lining of the nose, characterized by one or more of the following “nasal sx”:

- Nasal congestion
- Nasal pruritis
- Rhinorrhea
- Sneezing

Nasal sx lasting > 1 hr on most days.

Prevalence

Approx 20% of the US population.

Nasal allergies responsible for:

- 10 million medical office visits
- 28 million days of restricted activity.
- 10 million missed work days.
- 2 million missed school days.
- Cost for tx = $1.16 billion/yr (1990)
- Cost due to lost work days = $639 million/yr (1990)

Prevalence

- Males and females equally affected.
- No apparent ethnic prediliction.
- Temperate areas of North America and Eurasia.

Ages affected

- Not seen until after age 4 or 5.
  - (Takes approx 3 pollen season exposures).
- 10-15% in adolescents (adolescents and young adults).
- Peak age 30 (decades 2, 3 and 4).

Ages affected

Elderly:

- Decreased IgE production.
- Perennial rhinitis rarely caused by allergic mechanisms.
- Non-allergic (autonomic imbalance, alteration muscarinic receptors, earlier nasal disorder).
- “Old man’s drip”

Predisposition

- Genetic:
  - Positive FHx (polygenic inheritance)
  - Negative FHx does not rule out dx of AR
- Atopic dermatitis:
  - Early sign of predisposition to allergy.
  - 13% -/- parent, 30% +/- parent/sibling, 50% +/+ parent.
- Previous exposure/environmental factors

Comorbidities ass'd with AR

- Asthma
- Sinusitis
- Otitis Media (with effusion)

(AR occurs frequently in pts with asthma and atopic dermatitis.)

Symptoms

Direct:

- Nasal congestion
- Rhinorrhea
- Pruritis
- Sneezing
- Eye tearing & pruritis
- Ear & palate pruritis
- Post nasal drip
- Anosmia

Symptoms

Non-nasal:

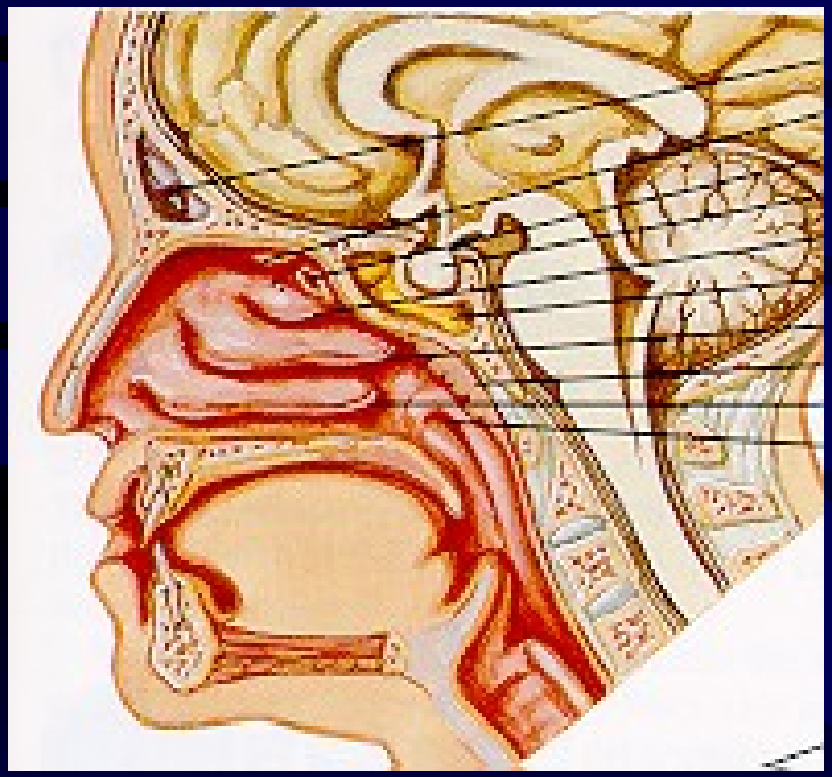
- HA
- Sore throat
- Chronic cough
- Mouth breathing

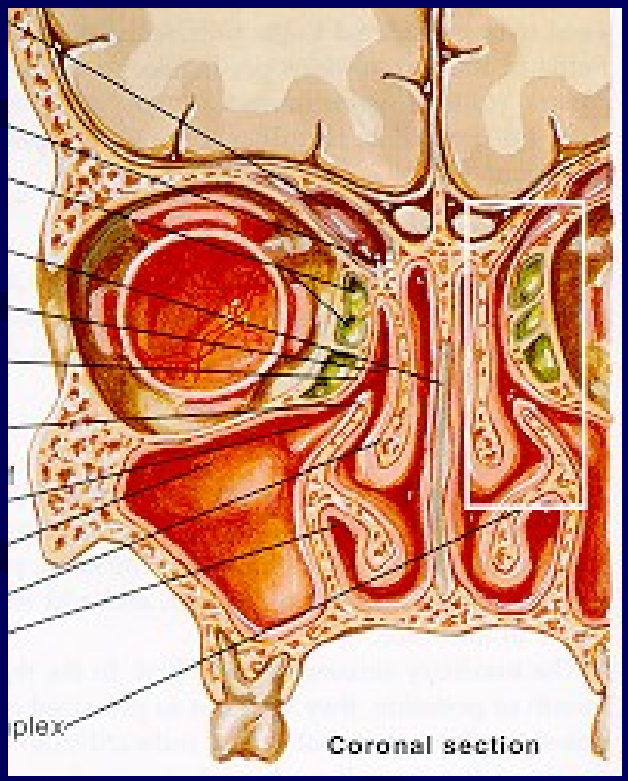
Symptoms

Psychosocial/Cognitive:

- Fatigue
- Depression
- Irritability
- Anxiety
- Sleep disturbance
- Poor concentration
- Reduced productivity
- Impaired learning, decision making and psychomotor speed

Anatomy





Mechanism

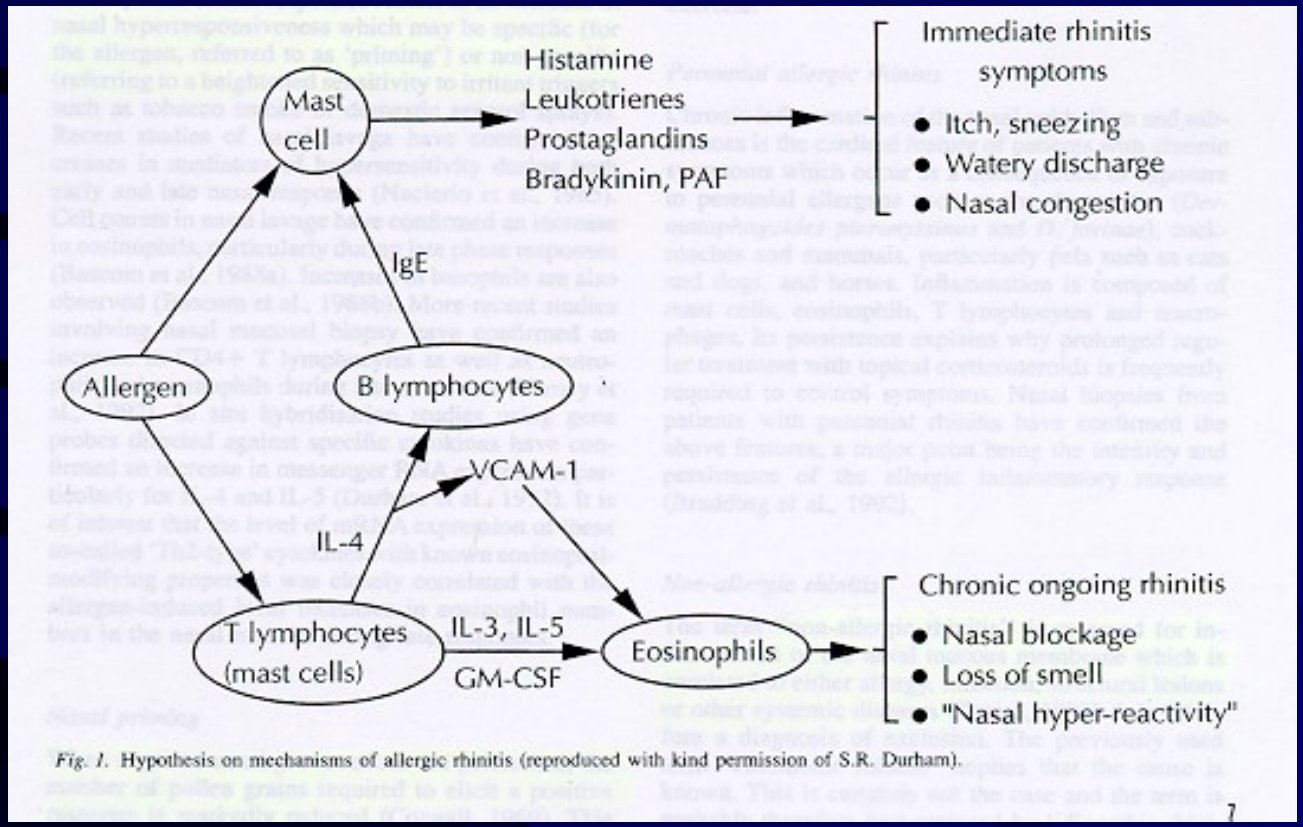


Fig. 1. Hypothesis on mechanisms of allergic rhinitis (reproduced with kind permission of S.R. Durham).

- **Histamine**: pruritis, sneezing, rhinorrhea
- **Acetylcholine**: stimulates glandular secretion

Mediator Effects

- Vasodilation and increased vascular permeability
  - (nasal congestion)
- Increased glandular secretion
  - (mucus rhinorrhea)
- Stimulation of afferent nerves
  - (pruritis & sneezing)

Types of Allergic Rhinitis

- Seasonal (intermittent sx)
- Perennial (chronic & persistent sx)

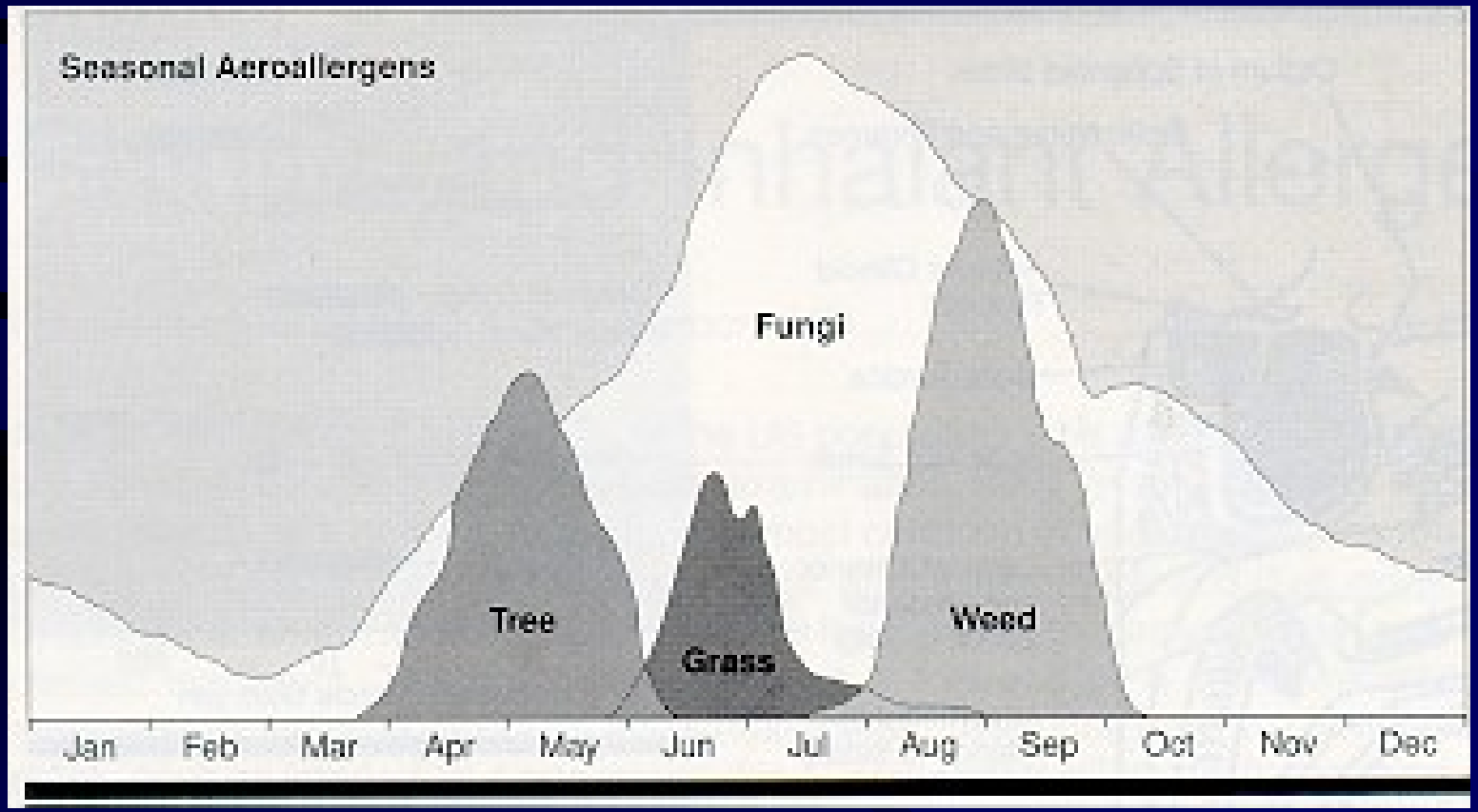
Seasonal Rhinitis

- **Pollen:**
  - Spring (March-June) = **Trees**
  - Summer (May-August) = **Grass**
  - Fall (August-October) = **Weeds**
- **Mold:**
  - Spores in outdoors have seasonal variation (reduced #'s in winter, increased in summer/fall due to humidity).
- **House dust mites:**
  - Generally a "perennial" allergen, but may be increased in damp autumn months.

Perennial Rhinitis

- **Fungi/mold:**
  - Exposure peaks accompany activities such as harvesting, cutting grass and leaf raking.
- **Pet Dander** (cats, dogs):
  - Can linger up to 4 months after pet removal.
- **House dust mites:**
  - Live in bedding, carpets and upholstery.
  - Dietary preference: human epidermal scales.
- **Cockroaches:**
  - Respiratory allergy
  - Important allergen in inner-city asthma.

Seasonal vs. Perennial Allergic Rhinitis



"Rhinitis": Differential diagnosis

- Acute
  - Viral
  - Bacterial
- Chronic
  - Seasonal vs Perennial
  - Chronic infectious rhinosinusitis
  - Nonallergic
  - Vasomotor
  - Gustatory
  - Nonallergic Rhinitis with eosinophilia
  - Primary atrophic
  - Rhinitis medicamentosa
  - Associated with systemic dz
  - Associated with systemic immunological dz
  - Emotional
  - Nasal neoplasm
  - Trauma

Diagnosis

- History
- Physical exam
- Skin prick testing, Nasal smear, etc.

History

- General medical hx
- Rhinological sx
  - (environmental and/or occupational factors)
- Family Hx
- Frequency of sx
  - (daily, episodic, seasonal, perennial)
- Duration
- Severity (increased, decreased or same)
- Qualitate nasal discharge:
  - AR: clear and watery
  - Bacterial rhinitis/sinusitis: pus (thick/discolored)
  - Chronic sinusitis: purulent nasal drainage, HA, halitosis.

Physical exam

Nose

- Nasal mucosa classically pale blue, but not diagnostic (60%).
- Thick yellowish secretions suggest infection.
- Structural deformities that may impede air flow (deviated nasal septum, nasal polypys, hypertrophied turbinates).
- “Allergic Salute”
- “Dennie-Morgan” line

Eyes

- “Allergic Shiners”
- Conjunctivitis
- Tearing

Ears

- Fluid
- Infection

Lungs

- Wheezing
- Persistent coughing

Other areas

- Stigmata of atopic diseases in conjunction with nasal sx:
  - atopic eczema, asthma

Skin Prick Testing

- IgE-mediated rxn (Type I).
- Small, but significant potentail for anaphylactic rxn.
- Wheal & flare response (15-20 minutes)
- Includes a “positive” and “control” soln.
- Positive rxn = over 3cm wheal with ass’d flare and pruritis (no rxn to neg control).

Skin Prick Testing (cont.)

- # of skin test allergens limited to common aeroallergens in pt's environment.
- False positives (dermatographism)
- False negatives (interference by meds, i.e. antihistamines)

Skin Prick Test (cont.)

- Discontinue antihistamine use prior to skin testing:
  - Benadryl, CTM: 48 hrs
  - Claritin: 96 hrs
  - Atarax: 120 hrs
  - Hismanal: 6 weeks
- TCA's and some antipsychotics may also block skin test results.

In vitro serum test (RAST)

- Serum levels of specific IgE antibodies.
- Consider in rare pts who:
  - have extensive skin disease
  - have dermatographism
  - must take medication that interferes with skin testing
  - children may prefer blood draw to skin test

Nasal smears

- Eosinophils may help differentiate “allergic” from “infectious” rhinitis (neutrophils).

Other diagnostics

- **Peripheral blood eosinophil counts**
  - does not assist in allergy diagnosis.
- **Rhinoscopy**

Medication Arsenal

- Antihistamines (first and second generation)
- Decongestants
- Corticosteroids
- Cromolyn Sodium
- Ipratropium

Antihistamines First Generation

- i.e.: Benadryl, Chlor-Trimeton (CTM)
- Mechanism: inhibition of histamine (H1) receptors.
- Effect: reduce sneezing, nasal pruritis and rhinorrhea, but not congestion.
- Note:
  - OTC
  - Work better in “seasonal” rhinitis.
- Side Effects: anticholinergic activity --> adverse CNS effects.

Antihistamines Second Generation

- i.e.: Claritin, Allegra, Zyrtec
- Mechanism: inhibit histamine (H1) receptors.
- Effect: same as First generation.
- Note:
  - Nonsedating (Zyrtec is low-sedating)
  - Prescription only
- Side effects: Seldane (Terenadine, now off market) -- “Black-box warnings” related with serious cardiac arrhythmias (w/ macrolide, antifungals).

Decongestants (oral/topical)

- i.e.: Sudafed (oral), Afrin (topical)
- Mechanism: alpha-adrenergic agonist.
- Effect: vasoconstriction restricts blood flow to nasal mucosa decreasing nasal obstruction (no influence on pruritis, sneezing or nasal secretion).
- Side effects:
  - Oral: HA, nervousness, irritability, tachycardia, palpitations, insomnia.
  - Topical(nasal): prolonged use (>5-7 days) leads to **rhinitis medicamentosa**

Decongestants

Rhinitis Medicamentosa (RM)

- Prolonged use of topical decongestant may induce rebound congestion upon withdrawal.
- Leads to inflammatory hypertrophy of nasal mucosa, termed RM.
- Caused by down regulation of alpha-adrenoreceptors --> less sensitive to endogenously released NE and exogenously applied vasoconstrictors.
- Tx: wean over 7-10 days while reducing inflammation by intranasal steroids.

Corticosteroids (intranasal)

- i.e.: Vancenase, Flonase
- Mechanism:
  - reduce inflammation
  - suppress neutrophil chemotaxis
  - mildly vasoconstrictive
  - reduce intracellular edema
- Effect: reduce nasal blockage, pruritis, sneezing and rhinirrhea.

Corticosteroids (continued)

Note:

- most potent single medication for tx of AR.
- intanasal: acts locally.
- goal: control sx with lowest possible dose.
- >90% achieve symptomatic relief.
- most effective when started several days before exposure and used on regular basis.
- therapeutic efficacy within 1-3 days, but max efficacy may take up to 3 weeks.
- compliance is critical.

Side effects: nasal irritation, bleeding (nasal septal perforation).

Cromolyn Sodium (intranasal)

- i.e: Nasalcrom
- Mechanism: mast cell stabilizing agent --> reduces release of histamine and other mediators.
- Effects: reduces nasal pruritis, sneezing, rhinorrhea and congestion.
- Note:
  - prophylactic use: start before pollinosis sx or unavoidable/predictable exposures.
  - disadvantage: frequent dosing (q4hrs).
- Side effects: locally, <10% of pts (sneezing, nasal stinging, burning, irritation).

Ipratropium (intranasal)

- i.e.: Atrovent (intransal)
- Mechanism: inhibits muscarinic cholinergic receptors.
- Effect: reduces watery rhinorrhea (no effect on nasal itching, sneezing or nasal congestion).
- Note:
  - limited to control of watery secretions.
  - effective at reducing both “cold-air” and “gustatory”rhinitis.
- Side effects: irritation, crusting, epistaxis.

Saline (intranasal)

- i.e.: NaSal, SeaMist, Ocean, Ayr
- Effects: relief from crusting and can be soothing.

Treatment Options

1) Avoidance/modifying factors/patient education

- bed encasements (allergen-impermeable covers)
- wash bed sheets @ >130 F
- dusting/vacuuming
- air conditioning/filters
- indoor humidity <40%
- pets
- choosing environment
- explain to pts how meds work

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*Twin	39x75x8	~~$29.95~~	$27.99	49.95	$39.99	52.95	$41.99
*Long Twin	39x80x8	~~$32.95~~	$31.99	51.00	$40.99	53.50	$42.99
*Full	54x75x8	~~$35.95~~	$33.99	54.95	$43.99	57.95	$46.99
*Queen	60x80x8	~~$49.95~~	$42.99	66.95	$53.99	69.00	$56.99
*King	78x80x8	~~$59.95~~	$52.99	79.95	$65.99	81.95	$68.99
*Cal. King	73x84x8	~~$59.95~~	$52.99	79.95	$65.99	81.95	$68.99

*Available in 11" or 14" for extra-thick mattresses. +$ extra.

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Queen	21x31	~~$7.95~~ ea.	$6.99 ea.	11.50	$8.99 ea.	12.95	$9.99 ea.
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Cal. Long Twin	37x84x8	17.50	~~$13.95~~	$12.99
Full	54x75x8	18.50	~~$14.95~~	$13.99
Queen	60x80x8	20.50	~~$16.95~~	$15.99
*King	78x80x8	25.00	~~$19.95~~	$18.99
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Treatment Options (cont.)

2) Antihistamines +/- Decongestants

- intermittent AR episodes
- antihistamines = first line tx (sneezing, pruritis, rhinorrhea)
- if nasal congestion a major sx, add an oral decongestant.
- combined tx with **antihistamine/decongestant** control sx better than with antihistamine alone.

Treatment Options (cont.)

3) Add Nasal Steroids

- prolonged sx
- add to antihistamine/decongestant regimen
- will reverse preexisting inflammation
- will prevent nasal priming

Immunotherapy (ITX)

Should be considered if:

- pharmacotherapy insufficiently controls sx or produces undesirable side effects.
- appropriate avoidance measures fail to control sx.
- h/o AR for at least 2 seasons (seasonal) or 6 months (perennial).
- positive skin tests correlate with rhinitis sx.

Immunotherapy (cont.)

Contraindications:

- age < 5-6 yrs.
- use of beta-blockers.
- contraindication to epinephrine.
- pt non-compliance.
- autoimmune dz.
- induction during pregnancy (maintenance OK).
- uncontrolled asthma, FEV_1<70%

Immunotherapy (cont.)

- 80-85% pts derive long-lasting symptomatic relief.
- After 3-5 seasons with adequate relief, stopping should be considered.
- ~60% pts will continue to derive symptomatic benefit with reduced need for medication.
- All pts on ITX should be encouraged to maintain environmental avoidance and may have to use concomitant medication (i.e.: antihistamines).

Who/when to refer to an Allergist

- The need to assess allergen-specific IgE-mediated mechanisms of sx causation.
- When pt does not respond to indicated tx (may need rhinoscopy, imaging studies or eval of immunocompetence).
- Any pt with a treatable complication of allergic dz may benefit from a specialized referral.

Patient #1

- HPI: 22 yo WM construction worker o/w healthy c/o tearing eyes, excessive sneezing and profuse watery runny nose occurring every spring when he works outdoors.
- PE:
  - VS: T 97.6, 118/76, HR 60, RR 12
  - HEENT: no frontal/maxillary sinus tenderness; ocular tearing and scleral injection; TM's clear; cyanotic/boggy nasal mucosa, thin/clear nasal d/c; oropharynx clear.
  - Lungs: CTAB
  - Skin: no rashes or lesions.

Seasonal allergic rhinitis

Keys to dx:

- h/o intermittent sx, related with time of year.
- PE: ocular tearing, clear “watery” nasal d/c, sneezing.

Tx: antihistamine prn or daily use

Patient #2

- HPI: 19 yo AD BF presents with yellowish nasal d/c x 5 days. She states she initially developed a sore throat and felt fatigued. The sore throat has since resolved. She continues to feel fatigued, and has lost her sense of smell and taste. Denies F/S/C or SOB.
- PMH: asthma

Patient #2 (cont.)

- PE:
  - VS: T 99.9, 122/80, HR 86, RR 12
  - HEENT: no frontal/maxillary sinus tenderness; no ocular tearing or scleral injection; TM's clear; +erythematous nasal nares, nasal mucosa erythematous with mucopurulent d/c; mildly erythematous oropharynx w/o exudates or tonsillar hypertrophy.
  - Neck: mildy tender, shoddy cervical adenopathy.
  - Lungs: mild end expiratory wheezes. No egophany.
  - Skin: no rashes or lesions.

Viral vs. Bacterial Rhinitis

Keys to dx:

- Infectious process: mucopurulent nasal d/c, tender cervical lymphadenopathy, low-grade fever, acute process.

Tx: if viral rhinitis is suspected: Tylenol, fluids and rest (bacterial superinfection may require additional Abx tx).

Patient #3

- HPI: 34 yo WM c/o having a “chronic cold”. States his nose is always somewhat congested, with clear d/c. Denies excessive sneezing or ocular tearing. Has been put on CTM in past with minimal success, and has since quit use secondary to feeling sluggish while using.

Patient #3 (cont.)

- PE
  - VS: T 98.6, 124/84, HR 74, RR 14
  - HEENT: no frontal/maxillary sinus tenderness; sclera non-injected; TM's clear; transverse crease over lower portion of nose, erythamatous nasal mucosa with scant thin/clear d/c; oropharynx mildly erythematous w/o exudates or tonsillar hypertrophy.
  - Lungs: CTAB
  - Skin: infraorbital cyanosis bilat; papular, lichenified plaques of antecubital fossae bilat.

Perennial allergic rhinitis

Keys to dx:

- "Year-round" sx
- Clear nasal d/c; can see erythematous nasal mucosa in AR.
- Appears to have co-existent atopic derm.

Tx: antihistamine/decongestant + nasal steroid (+ nasal saline).

Note:

- pt would benefit from a non-sedating antihistamine during day.
- may benefit from skin testing (avoidance, modifying factors).

Patient #4

- HPI: 38 yo Asian male c/o frontal HA's, thick yellow nasal d/c, and an occasional productive cough (thick yellowish-green sputum) x 1 week. States that leaning his head forward elicits facial pain/pressure. His wife has commented that he has "bad breath" despite attempts at brushing his teeth. Admits to frequent sinus infections similar to current sx, as well as "year-round" nasal congestion and intermittent d/c, yet that nasal d/c is usually clear. Smokes 1 pack cigarettes/day x 20 yrs.

Patient #4 (cont.)

- PE
  - VS: T 100.1, 134/90, HR 92, RR 18
  - HEENT: + right maxillary sinus tenderness; right TM mildly injected but w/o effusion; erythematous nasal mucosa with thick green d/c, hypertrophied inferior nasal turbinates bilat; + greenish streaking of posterior oropharynx, + halitosis.
  - Neck: no adenopathy
  - Lungs: CTAB
  - Skin: infraorbital cyanosis; no rashes or lesions.

1) Recurrent chronic sinusitis

2) Perennial allergic rhinitis

Keys to dx:

- RCS: sinus tenderness, facial pain with leaning forward, mucopurulent nasal d/c, halitosis, h/o perennial allergic rhinitis w/ recurrent sinus infections.
- Perennial AR: “year-round” nasal congestion w/ clear d/c.

Tx:

- Sinusitis: oral Abx
- AR: antihistamine, decongestant, nasal steroid, nasal saline, pt education (avoidance, modifying factors). Skin testing. Stop smoking.

Questions?